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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,955	10/29/2004	Kazunori Kobayashi	261119US90PCT	5313

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EXAMINER
ARMSTRONG, ANGELA A

ART UNIT	PAPER NUMBER
2626	

NOTIFICATION DATE	DELIVERY MODE
10/08/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)
	10/510,955	KOBAYASHI ET AL.
	Examiner	Art Unit
	ANGELA A. ARMSTRONG	2626

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>29 October 2004</u>.

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-21</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1,5-8 and 10-21</u> is/are rejected.

7) ☒ Claim(s) <u>2-4 and 9</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>10/29/04;08/02/06</u>.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1.   The information disclosure statements (**IDS**) submitted on October 29, 2004 and August

2, 2006 are being considered by the examiner.

Claim Rejections - 35 USC § 101

2.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or
> any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

Claims 10 and 21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to

non-statutory subject matter. Claims 10 and 21 are directed to a sound acquisition computer

Program. A computer program does not fall within one of the statutory classes of invention and

are not subject matter eligible for patent protection.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

4.   Claims 1, 5, 7, 8, 10-14, and 16-21are rejected under 35 U.S.C. 103(a) as being

unpatentable over Balan (US Patent No. 7,218,741) in view of Marash (WO 01/37435).

5.   Balan discloses a system and method for adaptive multi-sensor arrays. Regarding claims

1 and 7-8, Balan teaches a sound acquisition method (and provides support for an apparatus at

element 401) for acquiring sound from each sound source by microphones of plural channels

(col. 4, line 66) according to the present invention, comprising: (a) a state deciding step including

an utterance deciding step of deciding an utterance period from signals received by said plural-

channel microphones (col. 3, lines 60-63 – the voice activity detector); (b) a sound source

position detecting step of detecting the position of said each sound source from said received

signals when the utterance period is decided in said utterance deciding step (col. 3, lines 60-63);

(c) a frequency domain converting step of converting said received signals to frequency domain

signals (col. 5, lines 13-14); (d) a covariance matrix calculating step of calculating a covariance

matrix of said frequency domain received signals (col. 5, lines 3-31); (e) a covariance matrix

storage step of storing said covariance matrix for each sound source based on the result of

detection in said sound position detecting step (col. 5, lines 3-31-- covariance matrix is updated).

Balan does not teach calculating filter coefficients, filtering the received signals of said plural

channels by the calculated filter coefficients of said plural channels, respectively; and adding

together the results of filtering in said plural channels, and providing the added output as a send

signal. Marash teaches a system for beamforming design and implementation and provides for

generating filter coefficients determined by a covariance matrix, summing the outputs of the

beamformer (page 13, line 23 to page 14, line 5) and processing of the noise covariance matrix

(page 14, line 18 to page 15, line 3). Marash teaches the filter coefficients are set so as to

maximize the signal to noise ratio of the desired signal (page 7, lines 1-3). It would have been

obvious to modify the system Balan to implement the filter coefficient processing suggested by

Marash, for the purpose of enhancing the received signal by maximizing the signal to noise ratio.

6.   Regarding claim 5, the combination of Balan and Marash disclose assigning weights to

the sound sources (page 6, lines 1-20).

7.   Regarding claim 10, Balan discloses the system can be implemented in software (col. 4,

lines 21-28).

8.   Regarding claims 11 and 16-17, Balan teaches a sound acquisition method (and provides

support for an apparatus at element 401) for acquiring sound from at least one sound source by

microphone (col. 4, line 66) and teaches (a) deciding an utterance period from signals received

(col. 3, lines 60-63 – the voice activity detector); a frequency domain converting step of

converting said received signals to frequency domain signals (col. 5, lines 13-14); a covariance

matrix calculating step of calculating a covariance matrix of said frequency domain received

signals (col. 5, lines 3-31); a covariance matrix storage step of storing said covariance matrix for

each sound (col. 5, lines 3-31-- covariance matrix is updated). Balan does not teach receiving

signals from a loudspeaker, calculating filter coefficients, filtering the received signals,

cancelling an echo sound; and adding together the results of filtering in said plural channels, and

providing the added output as a send signal. Marash teaches a system for beamforming design

and implementation and provides for generating filter coefficients determined by a covariance

matrix, summing the outputs of the beamformer (page 13, line 23 to page 14, line 5), processing

the signals to perform echo cancelling (page 24, line 21 to page 26, line 8) and processing of the

noise covariance matrix (page 14, line 18 to page 15, line 3). Marash teaches the filter

coefficients are set so as to maximize the signal to noise ratio of the desired signal (page 7, lines

1-3). It would have been obvious to modify the system Balan to implement the filter coefficient

and echo cancellation processing suggested by Marash, for the purpose of enhancing the received

signal by maximizing the signal to noise ratio.

9.　　　　Regarding claims 12 and 19, the combination of Balan and Marash teach said state

decision step includes a step of deciding a noise period from said acquired signal and said

received signal; said covariance matrix calculating step includes a step of calculating a

covariance matrix in said noise period; said covariance matrix storing step includes a step of

storing said covariance matrix in said noise period; and said filter coefficient calculating step

calculates received signal filter coefficients of said at least one channel and said acquired signal

filter coefficients based on said stored covariance matrices in said utterance period, said

receiving period and said noise period so that said acoustic echo and noise are cancelled (page

15, lines 1-3 and page 24, line 21 to page 26, line 8 – the system determines the noise covariance

matrix and implements echo cancellation in the adaptive filter beamformer process).

10.　　　Regarding claims 13 and 18, the combination of Balan and Marash teach a microphone

for plural channels (col. 4, line 66) and sound source detecting for detecting the sound source

position (col. 3, lines 60-63).

11.　　　Regarding claims 14 and 20, the combination of Balan and Marash disclose assigning

weights to the sound sources (page 6, lines 1-20).

12.　　　Regarding claim 21, Balan discloses the system can be implemented in software (col. 4,

lines 21-28).

13.   Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balan in

view of Marash and further in view of Sim (US Patent No. 6,771,219).

14.   Regarding claims 6 and 15, Balan does not teach multiplying the covariance matrix by a

weight based on the diagonal component and a matrix. Sim discloses an adaptive beamforming

method which vector weights are updated based on a diagonal matrix component (col. 3, line 27

to col. 4, line 4). Sim teaches the system provides adaptive beamforming methods capable of

reducing computational load. It would have been obvious to one of ordinary skill at the time of

the invention to modify the system of Balan, as modified by Marash, and to implement the

matrix weighting as taught by Sim, because such a modification would generate the

beamforming adaptive weighting with a reduction in processing and computational loads.

Allowable Subject Matter

15.   Claims 2-4 and 9 are objected to as being dependent upon a rejected base claim, but

would be allowable if rewritten in independent form including all of the limitations of the base

claim and any intervening claims.

Conclusion

16.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

17.   Balan (US Patent No. 7,158,433)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANGELA A. ARMSTRONG whose telephone number is (571)272-7598. The examiner can normally be reached on Monday-Thursday 11:30-8:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick N. Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Angela A Armstrong/
Primary Examiner, Art Unit 2626